Name:

at1124exam: Radicals and Squares (v909)

Question 1

Simplify the radical expressions.

$\sqrt{12}$	$\sqrt{75}$	$\sqrt{45}$
$\sqrt{2 \cdot 2 \cdot 3}$	$\sqrt{5 \cdot 5 \cdot 3}$	$\sqrt{3 \cdot 3 \cdot 5}$
$2\sqrt{3}$	$5\sqrt{3}$	$3\sqrt{5}$

Question 2

Find all solutions to the equation below:

$$3\left((x+5)^2 - 8\right) \;=\; 84$$

First, divide both sides by 3.

$$(x+5)^2 - 8 = 28$$

Then, add 8 to both sides.

$$(x+5)^2 = 36$$

Undo the squaring. Remember the plus-minus symbol.

$$x + 5 = \pm 6$$

Subtract 5 from both sides.

$$x = -5 \pm 6$$

So the two solutions are $x = 1$ and $x = -11$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 + 18x = -56$$

$$x^2 + 18x + 81 = -56 + 81$$
$$x^2 + 18x + 81 = 25$$
$$(x + 9)^2 = 25$$
$$x + 9 = \pm 5$$
$$x = -9 \pm 5$$
$$x = -4 \quad \text{or} \quad x = -14$$

Question 4

Any quadratic function, with vertex at (h, k), can be expressed in vertex form:

$$y = a(x - h)^2 + k$$

A quadratic function is shown below in standard form.

$$y = 2x^2 - 20x + 41$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 2 .

$$y = 2(x^2 - 10x) + 41$$

We want a perfect square. Halve -10 and square the result to get 25 . Add and subtract that value inside the parentheses.

$$y = 2(x^2 - 10x + 25 - 25) + 41$$

Factor the perfect-square trinomial.

$$y = 2((x - 5)^2 - 25) + 41$$

Distribute the 2.

$$y = 2(x - 5)^2 - 50 + 41$$

Combine the constants to get **vertex form**:

$$y = 2(x - 5)^2 - 9$$

The vertex is at point $(5, -9)$.